

Idaho National Engineering & Environmental Laboratory
Bechtel BWXT Idaho LLC.

HOTSY CORPORATION HIGH PRESSURE SPRAYER

Summary:

The Hotsy high-pressure sprayer system was deployed at WAG 5 as part of the ARA-16 tank removal action. The system helped clean contamination out of the piping associated with the tank before the piping was removed and shipped for disposal. The sprayer is also being used to clean the interior of the tank. The high pressure and temperature of the water aided in the removal of sludge from the pipe and tank interior. A new field designed high-pressure header was added to the equipment prior to successful deployment.

The original solution for the piping involved shipping the waste to ATG in Washington State for aggressive decontamination. Total estimated costs for this plan were \$900,000. ATG is still expected to ship and treat the sludge generated by this action. The cost associated with this portion of the work is \$125,000; therefore \$775,000 is likely to be avoided. Use of the Hotsy was significantly less costly (\$53,000 to purchase the unit).



Low-volume wastewater was another benefit of the Hotsy sprayer. Deployment of the system reduced costs associated with disposal of excess wastewater that would have been produced using other systems and helped reduce worker exposure to the contamination in the excavated piping. Reduction of the wastewater by 50% resulted in another \$6,685 in savings to the project.






The sprayer is now being used with a long extension to provide dust suppression as contaminated concrete walls are being demolished. It provides enough water to control fugitive dust without generating much wastewater. The extension allows the worker to stand away from the impact zone and avoid splintering concrete as well as provides distance from low radiation that is associated with demolition work. Workers can stand behind barriers and still effectively control dust and conduct decontamination procedures.

Deployment of this system helped satisfy STCG need 6.1.33 (Improved Containment Control for Airborne Contamination Transport During Excavation and Drilling).

Qualitative Benefit Analysis

Programmatic Risk	<input type="radio"/> Use of this technology had minimal impact on programmatic risk.
Technical Adequacy	<input checked="" type="radio"/> For pipe cleaning, the unit adequately removes smaller quantities of sludge; however, much larger volumes of water are needed to move heavier metal shavings and debris. The unit is capable of achieving adequate dust suppression, while minimizing water use.

Safety	 <p>Safety to workers is improved by increasing the distance between the worker and the material being demolished. This results in a reduction in exposure to radiation and to flying concrete shards. In pipe cleaning there is reduced worker exposure as well as minimized wastewater generated.</p>
Schedule Impact	 <p>Use of the unit had a minimal impact on schedule.</p>

				
Major Improvement	Some Improvement	No Change	Somewhat Worse	Major Decline

Quantitative Benefit Analysis							
Cost Impact Analysis	<p>Choosing this technology avoided the use of ATG as an outside contractor who had provided an estimate of \$900,000 to completely handle the decontamination of the pipe. ATG is still expected to ship and treat the sludge generated by the Hotsy. The cost associated with this portion of the work is \$125,000; therefore \$775,000 is likely to be avoided. This amounted to a \$722,000 cost savings after deducting the cost of the Hotsy. Additional cost avoidance was achieved by not having wastewater to treat. Given that using the Hotsy produced 400 gallons of water and assuming other methods would have doubled that volume, the reduction in disposal and labor costs amounted to another \$6,685. The total cost avoidance was \$728,685. Reduced worker exposure also saves money in the long run.</p> <table> <tr> <td>Annual Savings</td><td>\$781,685</td></tr> <tr> <td>Life-Cycle Cost Savings</td><td>\$728,685</td></tr> <tr> <td>Return-On-Investment (ROI)</td><td>1375 %</td></tr> </table>	Annual Savings	\$781,685	Life-Cycle Cost Savings	\$728,685	Return-On-Investment (ROI)	1375 %
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CB Hotsy.xls
Wastewater Savings

Worksheet 1: Operating & Maintenance Annual Recurring Costs

Expense Cost Items	Before (B) Annual Costs	After (A) Annual Costs
1. Equipment	\$ -	
2. Purchased Raw Materials and Supplies	\$ -	\$ -
3. Process Operation Costs:		
Utility Costs	\$ -	\$ -
Labor Costs	\$ 11,700.00	\$ 5,850.00
Routine Maintenance Costs for Processes	\$ -	\$ -
Subtotal	\$ 11,700.00	\$ 5,850.00
4. PPE and Related Health/Safety/Supply Costs	\$ -	\$ -
5. Waste Management Costs:		
Waste Container Costs	\$ 1,120.00	\$ 560.00
Treatment/Storage/Disposal Costs	\$ 550.00	\$ 275.00
Inspection/Compliance Costs	\$ -	\$ -
Subtotal	\$ 1,670.00	\$ 835.00
6. Recycling Costs		
Material Collection/Separation/Preparation Costs:		
a) Material and Supply Costs	\$ -	\$ -
b) Operations and Maintenance Labor Costs	\$ -	\$ -
Vendor Costs for Recycling	\$ -	\$ -
Subtotal	\$ -	\$ -
7. Administrative/other Costs	\$ 900,000.00	\$ 125,000.00
Total Annual Cost:	\$ 913,370.00	\$ 131,685.00

Worksheet 2: Itemized Project Funding Requirements*
(i.e., One Time Implementation Costs)

Category	Cost \$
INITIAL CAPITAL INVESTMENT	
1. Design	\$ -
2. Purchase	\$ 53,000
3. Installation	\$ -
4. Other Capital Investment (explain)	\$ -
Subtotal: Capital Investment= (C)	\$ 53,000
INSTALLATION OPERATING EXPENSES	
1. Planning/Procedure Development	\$ -
2. Training	\$ -
3. Miscellaneous Supplies	\$ -
4. Startup/testing	\$ -
5. Readiness Reviews/Management Assessment/Administrative Costs	\$ -
6. Other Installation Operating Expenses (explain)	\$ -
Subtotal: Installation Operating Expense = (E)	\$ -
7. All company adders (G & A/PHMC Fee, MPR, GFS, Overhead, taxes, etc.)(if not contained in above items)	\$ -
Total Project Funding Requirements=(C + E)	\$ 53,000
Useful Project Life = (L) 1 Years Time to Implem 0 Months	
Estimated Project Termination/Disassembly Cost (if applicable) = (D)	\$ -
(Only for Projects where L<5 years; D=0 if L>5 years)	
TOTAL LIFE-CYCLE COST SAVINGS CALCULATION FOR IPABS-IS	
(Before - After) x (Useful Life) - (Total Project Funding Requirements + Termination)	
Total Life Cycle Cost Savings Estimate = (B - A) x L - (C+E+D)	\$728,685
RETURN ON INVESTMENT CALCULATION	
Return on Investment (ROI) % =	
$\frac{(Before - After) - [(Total Project Funding Requirements + Termination)/Useful Life]}{[Total Project Funding Requirements + Project Termination]} \times 100$	
$ROI = \frac{B-A-[(C+E+D)/L]}{(C+E+D)} \times 100$	1375 %
O&M Annual Recurring Costs:	Project Funding Requirements:
Annual Costs, Before= \$ 913,370 (B)	Capital Investment= \$ 53,000 (C)
Annual Costs, After= \$ 131,685 (A)	Installation Op. Exp= \$ - (E)
Net Annual Savings= \$ 781,685 (B-A)	Total Project Funds= \$ 53,000 (C+E)
Note: Before (B) and After (A) are Operating & Maintenance Annual Recurring Costs from Worksheet 1.	

Basis for Estimates

3	Process Operation Costs:
Utility Costs	
n/a	
Labor Costs	
The \$11,700 cost of labor is associated with the cost to process 800 gallons of wastewater. The \$5,850 is half this value which is the estimate for dealing with 400	
Routine Maintenance Costs for Processes	
n/a	

5	Waste Management Costs
The containers for 800 gallons of wastewater would have cost \$1,120. Half this number of containers would cost \$560. TSD costs for these would be \$550 or \$275 for half the	

7	Administrative/Other Costs
\$900,000 was a cost estimate provided by an outside vendor to completely remediate the ARA-16 contaminated tank and piping. Most of this cost was avoided by doing the work on-site with the Hotsy sprayer. A total of about \$725,000 of this cost has been avoided.	

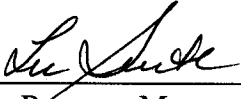
**SCIENCE AND TECHNOLOGY BENEFIT ANALYSIS
DEPLOYMENT APPROVALS**

Technology Deployed: HOTSY CORPORATION HIGH-PRESSURE SPRAYER

Date Deployed: 10/15/00

EM Program(s) Impacted: Environmental Restoration Program

Approval Signatures

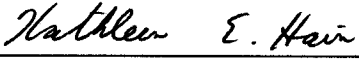


Contractor Program Manager 8/21/01

Date

N/A

Contractor Program Manager Date



DOE-ID Program Manager 8/23/01

Date

N/A

DOE-ID Program Manager Date